Applied Toponymy in the United States

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Introduction

Geographic names are necessary phenomena for spatial reference in an otherwise confusing landscape. Names are applied to landmarks in the development of our sense of place. Geographic names (toponyms) become the means by which one describes the landscape. Generally, names refer to specific features, and often convey information about how people categorize spatial phenomena. This activity of specific reference and categorization becomes quite complex, employing highly variable, personal, and often idiosyncratic methods of perception. Standardization of geographic names is therefore essential for purposes of emergency preparedness; regional and local planning; site selection and analysis; environmental problem-solving; cartographic application; and all levels of communication, all of which are elements in support of a nation's spatial data infrastructure.

Since names identify landmarks in a spatial environment, and since maps, whether conventional or digital, represent abstractly aspects and themes of the spatial environment, the use of geographic names is critical in even the most elementary use of almost any map. The application of geographic names is an integral part of the cartographic process, which is evident in every national mapping program worldwide as well as in numerous specialized and general applications throughout government and the private sector. However, the use of geographic names is not limited to cartographic application, but is inextricably part of countless applications, some of which are apparent, and some not so apparent. The recognition and use of geographic names as a specific element necessary for use in assessing and providing solutions to "real world" problems is *applied toponymy*. A basic element of applied toponymy is the standardized toponym or geographic name. It has been proven time and again that major projects often are delayed, and even postponed, until the geographic names are correct.

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Historical View

Applied toponymy is not new, but the term and its recognition conceptually as a means of assisting in solving problems has only recently gained attention and recognition among applied scientists in virtually all disciplines. This is partly a result of rapidly advancing technology especially related to increased use of geographic information systems (GIS—the electronic processing and analysis of spatial data), and as a tool for searching and retrieving on the Internet.

The nineteenth century was a time of continued and increased exploration as well as rapid development in modes of travel and cartographic advances. One of the first organized references to the problem of the use of non-standard geographic names came at the First International Geographic Congress in Antwerp in 1873. Delegates called for a common usage of place names on maps so that they would be rendered more correct and useable. In 1875, the Universal Postal Union declared it necessary to establish some means of standardizing the names of countries, cities, and towns for purposes of efficient delivery of the mail. In 1890, high-level officials in the United States Government established a committee to address the serious and growing problem of applying different names to the same geographic feature on maps and charts produced by its various bureaus. The members of this committee were concerned that its work would produce rivalry, or worse ambivalence, in the various agencies. The members approached President Benjamin Harrison regarding the problem, and on 4 September 1890, the President issued an executive order creating the first ever board to establish principles, policies, and procedures for standardizing geographic names within a country. This board was given the authority to adjudicate controversies, and its decisions were final. The systematic standardization of geographic names had begun.

In 1909, the International Cartographic Committee called on its members to recognize and address the issue of geographic names on maps, and in 1919 the International Hydrographic Conference issued a similar statement regarding chart making. By the mid-twentieth century, other international organizations, including the United Nations, had become involved because of the enormity of the problem.

Procedural Developments

It has always been understood that strong programs of domestic standardization will achieve international standardization. The United States has developed procedures that have produced a body of standard names for use by all interested parties. The paramount policy applied is that of local use and acceptance. To this end, the U.S. Board on Geographic Names has encouraged and assisted in the establishment and development of state names authorities. There are presently 49 state and two territorial authorities.[1] These bodies vary greatly in composition, organization, and activity, ranging from legally established boards and committees to advisory committees and sub-committees to state agencies charged with the task of making recommendations. However, all have the same goal, which is to achieve standardization of geographic names. Also, the Council of Geographic Names Authorities (COGNA)[2] serves as the organization through which the various state names authorities conduct joint activities and research, and there is an annual meeting that serves as a forum for presenting papers as well as debating issues and problems of applied toponymy.

Technological Developments

Technological advances begun in the 1970s have played a significant role in advancing the capabilities and visibility of applied toponymy.

In the United States at that time, most organizations realized that a single, unbiased, complete repository of geographic names, including the official name and locative attributes of the feature, was needed by all levels of government, by users throughout private industry, and by the general public. The U.S. Board on Geographic Names took an immediate and keen interest because establishing an electronic database would be an excellent vehicle for promulgating geographic names, and thereby aiding in the process of standardization. Because of the size and scope of a project such as this, the user community looked to the federal government to take the lead. In 1976, the U.S. Geological Survey (USGS), which is responsible for domestic names activity and for the National Mapping Program, agreed to undertake the project.

Once selecting the software and designing the database were complete, the arduous task of collecting data to populate the database was initiated. Actually, this aspect had been under study simultaneously

during the database design phase. The initial phase of data collection spanned a five-year period from 1976 to 1981, during which time geographic names and the locative attributes of the feature were recorded, encoded, and entered into the database. The source used for collection of this information was the large-scale topographic maps published by the USGS because these maps offered almost complete coverage of the United States and served as the single most comprehensive source of geographic names. Upon completion, a supplementary data collection effort spanning a period of two years examined the maps of the U.S. Forest Service and the charts of the Office of Coast Survey for names not found on the large scale topographic base maps used in the initial phase. Subsequently, data from most other federal sources were captured and encoded.

By this time, it was clear that the user community was wide and varied, extending well beyond that of cartographic application. Analysis determined that only about 30% of the known names appeared on the maps and charts thus far examined. To meet the needs of the growing user community, and in support of the National Mapping Program, a second phase of data compilation was identified. This compilation effort was begun in 1984 after methodology and procedures were put into place to assure adherence to the principles and policies of the U.S. Board on Geographic Names. This project includes identifying official state and local map and text sources, along with other current and historical maps and documents approved for use by the USGS Geographic Names Office. Data for each state are compiled separately, usually through a four-year contract with a state governmental agency or a state university. Most states and territories of the United States have completed both the initial and second phase, or are at some point in the extensive data collection phase.[3]

The Geographic Names Information System (GNIS), the official geographic names repository of the United States, has been completely redesigned, modernized, and made more efficient. A very significant aspect of the redesign includes spatially enabling the database. This means that feature extent will be available graphically as well as defined textually, and also means that the search capability will be extended to the spatial component as well. This is a major development in the realm of applied toponymy, allowing expanded capabilities and applications never before possible. This accomplishment will advance the presently

text-bound database to a new plateau of expanded capabilities, performance, and overall support for other systems while retaining all of the existing functions.

Many of the features represented in GNIS (mostly administrative and other cultural features) have existing spatial definitions, which may be readily incorporated. However, most physical features do *not* have such a spatial footprint, and so must be defined spatially, requiring an enormous commitment of resources. Further, the problem is exacerbated by the fact that there is no standard or existing algorithm for determining the extent of some natural feature types so that the spatial extent may be recorded. For example, what is the extent of a named mountain? At what point does the base of such a feature begin? Is it some function of contour lines, or is it subject to the usual perception within the naming process, which is impossible to measure, and which will vary widely regionally and even locally? Nevertheless, the goal is worth pursuing, and many aspects of spatial enabling can be accomplished.

Maintenance is crucial to user confidence, and so such a program was established in 1987 with participation from the U.S. Board on Geographic Names, the USGS (National Mapping Program), U.S. Forest Service (National Mapping Program), the Office of Coast Survey, and the National Park Service, with the Bureau of Land Management soon to become a participant. Until 1999, the data were forwarded to the Geographic Names Office in various ways for incorporation into the database. Since 1999, these data are keyed directly onto Internet-based forms, and sent to a holding area to be examined by Geographic Names Office staff, and then entered into the database.

Still, much data is not included by virtue of the overwhelming volume and the specific needs of the individual agencies. For a truly useful and viable maintenance program, inspiring unfaltering user confidence, it is necessary to include participation by a consortium of state and local organizations. To that end, there are two pilot projects presently under evaluation. One project, with the state of Florida, will involve a network of state and local organizations which will collect traditional text data for geographic names along with the geometry or "geography" of the features. These data will be funneled through a data clearinghouse to the state board on geographic names, then forwarded to the Geographic Names Office staff for processing.

The second state participating in the project is Delaware, and the procedures will be very similar to that of Florida except that the geographic names and geometry will be part of a larger map revision test project conducted in cooperation with the U.S. Geological Survey National Mapping Program. If, as expected, there is a favorable evaluation, participation eventually will include all other states and territories.

One of the most important aspects of applied toponymy is the ability to distribute and promulgate standardized geographic names to the widest possible user community. The advent of the Internet has led to an extraordinary expansion of this capability. Since 1995, the United States has developed an Internet presence with search engines allowing data to be retrieved from the domestic geographic names database and also the foreign geographic names database. Each database receives thousands of users per day, often reaching more than 25,000 per day. Users may download state files and foreign country files, with hundreds downloaded daily. Also, geographic names have been identified as a key element of data "mining" on the Internet using new "smart" search engines.

During the last decade of the twentieth century, many countries, including the United States, have developed national spatial data infrastructures (NSDI), which include data as well as technology, policies, standards, etc. necessary to support the NSDI. The purpose is to assure integrity and transportability of spatial data in an electronic environment for analysis and problem solving. In its most recent revision of July 3, 2001, the Office of Management and Budget, at the recommendation of the Federal Geographic Data Committee, suggested that geographic names be included as a distinct and defined data layer. This revision is under review, and presumably will be approved.

Summary and Conclusions

Applied toponymy is the practical application of various tools and the results of research for solving problems where geographic names issues are impacting projects of all types. These problems are impeding proper and appropriate communication of information, which at least wastes resources, and at worst can severely impact infrastructure and even lead to improper response in emergency situations and national security. The key to effective applied toponymy is the standardization of geographic names. National programs have assisted the efforts of

local and regional organizations to collect geographic names and to make recommendations to the U.S. Board on Geographic Names and the USGS Geographic Names Office. Geographic Names is now recognized as a distinct data layer by most countries in their national spatial data infrastructure. The information community also realizes and accepts that standardized geographic names are a key element for data mining through "smart" search engines soon to be widely available for Internet activity. Applied toponymy will have increasing visibility and recognition as a key element in communicating and managing the ever-increasing amount of available information.

Notes

1. Iowa does not have a state names authority.

2. Originally founded in 1976 as the Intermountain Names Council, it expanded in 1979 to become the Western States Geographic Names Council by including the states along the Pacific Coast. In 1991 all states west of the Mississippi River were admitted, and in 1998 the name was changed to COGNA and all states and territories of the United States were included.

3. Alaska, Kentucky, Michigan, and New York have not yet begun the extensive phase of data collection.